

***Student Major Classification System at SMAN 1 Sukomoro
Using the K-Nearest Neighbor Algorithm***
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ABSTRACT

This study was conducted to apply the K-Nearest Neighbor (KNN) algorithm to classify students' majors at Sukomoro 1 Public High School and to analyze the performance of the resulting model. The problem faced is that the process of determining majors is still done manually, which can lead to errors and is inefficient. The methods used included processing 300 data sets, dividing the data into training and testing sets, data normalization, and applying KNN with parameter optimization via GridSearchCV, followed by evaluation using 5-fold cross-validation. The results showed that the optimal value of K was 27, with an accuracy rate of 86.67%. Model evaluation showed an average accuracy of 75.42% with a standard deviation of 3.58%, as well as average precision, recall, and F1-score values of 0.87. The ROC curve AUC results showed a macro-average value of 0.974, indicating excellent classification performance. System testing using Black Box Testing achieved a 100% success rate, while user testing with the System Usability Scale (SUS) yielded a score of 80.83, which falls into the "excellent" category. Based on these results, the developed system is capable of supporting the process of classifying students' majors more accurately and efficiently and is suitable for use in a school environment.

Keywords: *Major Classification, K-Nearest Neighbor, K-Fold Cross Validation, Confusion Matrix, Black Box Testing, System Usability Scale, High School*